Rayat Shikshan Sanstha's
Arts, Science and Commerce College, Mokhada, Dist. Palghar
Department of Mathematics
List of Programs and Courses

Sr. No.	Program Name	Course code	Course Name
1	F.Y.B.Sc. Sem-I	USMT 101	Calculus-I
2	F.Y.B.Sc. Sem-I	USMT 102	Algebra-I
3	F.Y.B.Sc. Sem-I	USMTP01	Practical
4	F.Y.B.Sc. Sem-II	USPH201	Mathematical Physics
5	F.Y.B.Sc. Sem-II	USPH202	Electricity and Electronics
6	F.Y.B.Sc. Sem-II	USPHP2	Practical II
7	F.Y.B.Sc. Sem-II	USMT 201	Calculus-II
8	F.Y.B.Sc. Sem-II	USMT 202	Algebra-II
9	F.Y.B.Sc. Sem-II	USMTP02	Practical
10	S.Y.B.Sc. Sem-III	USMT 301	Calculus-III
11	S.Y.B.Sc. Sem-III	USMT 302	Algebra-III
12	S.Y.B.Sc. Sem-III	USMT 303	Discrete Mathematics
13	S.Y.B.Sc. Sem-III	USMTP03	Practical
14	S.Y.B.Sc. Sem-IV	USMT 501	Multivariable Calculus-II
15	S.Y.B.Sc. Sem-IV	USMT 502	Linear Algebra
16	S.Y.B.Sc. Sem-IV	USMT 503	Topology of Metric Spaces
17	S.Y.B.Sc. Sem-IV	USMT 5A4	Numerical Analysis-I
18	S.Y.B.Sc. Sem-IV	USMTP05	Practical

19	T.Y.B.SC. MATHEMTICS Sem-V	USMT 501	Multivariable Calculus-II
20	T.Y.B.SC. MATHEMTICS Sem-V	USMT 502	Linear Algebra
21	T.Y.B.SC. MATHEMTICS Sem-V	USMT 503	Topology of Metric Spaces
22	T.Y.B.SC. MATHEMTICS Sem-V	USMT 5A4	Numerical Analysis-I
23	T.Y.B.SC. MATHEMTICS Sem-V	USMTP05	Practical
24	T.Y.B.Sc. Sem-VI Mathematics	USMT 601	Basic Complex Analysis
25	T.Y.B.Sc. Sem-VI Mathematics	USMT 602	Algebra
26	T.Y.B.Sc. Sem-VI Mathematics	USMT 603	Topology of Metric Spaces & Real Analysis
27	T.Y.B.Sc. Sem-VI Mathematics	USMT 6A4	Numerical Analysis-II
28	T.Y.B.Sc. Sem-VI Mathematics	USMTP06	Practical

Programme Name: B. SC. Mathematics

Program outcome

At the completion of B.Sc. (Mathematics) the learner will be graduated with following outcomes:

Sr. No.	Programme Outcome
1	Ability to acquire in-depth knowledge of Algebra, Calculus, Geometry, Differential equations and several other branches of Mathematics. This also leads to study of related areas like Computer science, Physical science, Chemical science and Life science. Thus, this Program helps learners in building a solid foundation for higher studies in Mathematics
2	Utilize mathematics to solve theoretical and applied problems by critical understanding, analysis and synthesis.
3	Ability to communicate mathematics effectively by written, computational and graphic means.
4	Create mathematical ideas from basic axioms.
5	Ability to apply multivariable calculus tools in Physics, Economics, Optimization and understanding the architecture of curves and surfaces in plane and space etc.

Course Outcomes

Sr. No.	Unit	Outcome
F.Y.B.Sc. Sem. I& II, Paper 1 **Calculus-I& Calculus-II**		
1.	All units	This course gives introduction to basic concepts of Analysis with rigor and prepares students to study further courses in Analysis. Formal proofs are given lot of emphasis in this course which also enhances understanding of the subject of Mathematics as a whole. The portion on first order, first degree differentials prepares learner to get solutions of so many kinds of problems in all subjects of Science and also prepares learner for further studies of differential equations and related fields.
F.Y.B.Sc. Sem. I& II, Paper 2 **Algebra-I (Sem. I) & Discrete Mathematics(Sem. II)**		
2.	All units	This course gives expositions to number systems (Natural Numbers & Integers), like divisibility and prime numbers and their properties. These topics later find use in advanced subjects like cryptography andits uses in cyber security and such related fields.
S.Y.B.Sc. Sem. III& IV, Paper1 **Calculus (Sem. III) & Multivariable Calculus I(Sem. IV)**		
3.	All units	This course gives introduction to basic concepts of Analysis with rigor and prepares students to study further courses in Analysis. Formal proofs are given lot of emphasis in this course which also enhances understanding of the subject of Mathematics as a whole
S.Y.B.Sc. Sem. III& IV, Paper2 **Linear Algebra I (Sem III) & Linear Algebra II (Sem IV)**		
4.	All units	This course gives expositions to system of linear equations and matrices, Vector spaces, Basis and dimension, Linear Transformation, Inner product space, Eigen values and eigenvectors.
S.Y.B.Sc. Sem. III, Paper3 **Ordinary Differential Equations**		
5.	All units	Ordinary Differential Equations prepares learner to get solutions of so many kinds of problems in all subjects of Science and also prepares learner for further studies of differential equations and related fields.
S.Y.B.Sc. Sem. IV, Paper 3 **Numerical Methods**		
		Lerner will learn different types of Numerical methods to apply in different fields of Mathematics.

T.Y.B.Sc. Sem. V, Paper1 **Multivariable Calculus II**		
6.	All units	In this course students will learn the basic ideas, tools and techniques of integral calculus and use them to solve problems from real-life applications including science and engineering problems involving areas, volumes, centroid, Moments of mass and center of mass Moments of inertia. Examine vector fields and deneand evaluate line integrals using the Fundamental Theorem of Line Integrals and Green's Theorem; compute arc length.
T.Y.B.Sc. Sem. VI, Paper1 **Basic Complex Analysis**		
7.	All units	Students Analyze sequences and series of analytic functions and types of convergence, Students will also be able to evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula, they will also be able to represent functions as Taylor, power and Laurent series, classify singularities and poles, find residues and evaluate complex integrals using the residue theorem.
T.Y.B.Sc. Sem. V, Sem. VI Paper2 **Group Theory, Ring Theory (Sem V, Sem VI)**		
8.	All units	Students will have a working knowledge of important mathematical concepts in abstract algebra such as definition of a group, order of a finite group and order of an element, rings, Euclidean domain, Principal ideal domain and Unique factorization domain. Students will also understand the connection and transition between previously studied mathematics and more advanced mathematics. The students will actively participate in the transition of important concepts such homomorphisms & isomorphisms from discrete mathematics to advanced abstract mathematics.
T.Y.B.Sc. Sem. V, Sem. VI Paper3 **Topology of metric spaces (Sem V), Topology of metric spaces and real analysis** **(Sem VI)**		
9.	All units	This course introduces students to the idea of metric spaces. It extends the ideas of open sets, closed sets and continuity to the more general setting of metric spaces along with concepts such as compactness and connectedness. Convergence concepts of sequences and series of functions, power series are also dealt with. Formal proofs are given a lot of emphasis in this course. This course serves as a foundation to advanced courses in analysis. Apart from understanding the concepts introduced, the treatment of this course will enable the learner to explain their reasoning about analysis with clarity and rigour.
T.Y.B.Sc. Sem. V, Sem. VI Paper 4 (Elective-C) **Graph Theory**		
10.	All units	Upon successful completion of Graph Theory course, a

		student will be able to: 1. Demonstrate the knowledge of fundamental concepts in graph theory, including properties and characterization of graphs and trees. 2. Describe knowledgeably special classes of graphs that arise frequently in graph theory 3. Describe the concept of isomorphic graphs and isomorphism invariant properties of graphs 4. Describe and apply the relationship between the properties of a matrix representation of a graph and the structure of the underlying graph 5. Demonstrate different types of algorithms including Dijkstra's, BFS, DFS, MST and Huffman coding. 6. Understand the concept of Eulerian graphs and Hamiltonian graphs. 7. Describe real-world applications of graph theory.
T.Y.B.Sc. Sem. VI, Paper 4 (Elective-C) **Graph Theory and Combinatorics**		
11.	All units	Upon successful completion of Graph Theory course, a student will be able to: 1. Understand and apply the basic concepts of graph theory, including colouring of graph, to find chromatic number and chromatic polynomials for graphs 2. Understand the concept of vertex connectivity, edge connectivity in graphs and Whitney's theorem on 2-vertex connected graphs. 3. Derive some properties of planarity and Euler's formula, develop the under-standing of Geometric duals in Planar Graphs 4. Know the applications of graph theory to network flows theory. 5. Understand different applications of system of distinct representative and matching theory. 6. Use permutations and combinations to solve counting problems with sets and multi sets. 7. Set up and solve a linear recurrence relation and apply the inclusion/exclusion principle. 8. Compute a generating function and apply them to combinatorial problems.